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THE WEEKLY SUMMARY OF CURRENT SCIENCE

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8-7-4

PUBLIC HEALTH

Summer-Long Fly Control

Insect-free areas for the summer foreseen through use of chemical "extenders," added to present insecticides to increase their effective killing times.

➤ BY NEXT summer you may be able to spray your patio, picnic ground or campsite once and be rid of flies, mosquitoes and other insects for the entire season.

Chemical "extenders" added to our present insecticides, such as DDT, aldrin and lindane, will do the job, U.S. Department of Agriculture scientists hope.

When one of these extenders, methyl ethyl ketone, was used as a solvent for DDT, spray residues on foliage killed flies for 60 days and longer, compared to less than 15 days when the DDT was in an oil solution.

The fly-killing ability of aldrin and lindane was stepped up from less than 10 days under outdoor conditions to give "nearly perfect fly control" for more than 102 days. That would take care of June, July, August and the first week of September.

The scientists who developed the insecticide extender idea are W. N. Sullivan, entomologist, and Irvine Hornstein, chemist, working under the direction of R. C. Roark of the Agricultural Research Center at Beltsville, Md.

The new sprays while being tested were put on pine and spruce trees. At intervals twigs from the sprayed trees were taken into the laboratory and tested against flies.

During the test period, begun in the fall, daily temperatures varied from as high as 80 degrees Fahrenheit to as low as 23 degrees. More than eight and a half inches of rain and snow fell during the period, showing that the new sprays will not wash off in summer rains.

Department officials explain how the extenders work as follows:

Applied as an oil-base spray, DDT does not form long-lasting residues on foliage because the oil carrying the DDT penetrates into the leaf. However, when a highly volatile solvent such as methyl ethyl ketone is substituted for the oil in DDT sprays, it quickly vaporizes when sprayed so that only a residue of DDT remains on the foliage surface.

With aldrin and lindane sprays, using methyl ethyl ketone in place of oil only partially solves the problem of making these foliage sprays long-lived. Unlike DDT, these two insecticides are relatively volatile materials themselves. The scientists slowed down their rate of evaporation by adding a chlorinated terphenyl, trade-named Aroclor, to the spray solution. These insecticides are soluble in the non-volatile chlorinated terphenyls and, as a result, the vapor pressure of the insecticide is lowered.

When methyl ethyl ketone insecticide sprays were applied with either a power sprayer or mist blower, very concentrated solutions containing approximately 50% by weight of the insecticide extender were used. The methyl ethyl ketone began to evaporate almost as soon as the spray left the nozzle. As the material evaporated the spray droplets became small insecticidal pellets, averaging between 50 and 100 microns (about 1/500 to 1/250 of an inch) in diameter, which carried for relatively long distances.

The pellets adhered strongly to such target surfaces as foliage, forming a uniform deposit over the leaf or branch, but not penetrating or otherwise damaging it.

Flies were used as convenient "guinea pigs" for the tests, but it is hoped that the effect would be the same on other insect pests.

Science News Letter, August 7, 1954

PHYSICS

Swedish Scientists Make Element 100

➤ SWEDISH SCIENTISTS have manufactured the heaviest element in the universe, number 100, by bombardment in a cyclotron, it is revealed in the *Physical Review* (July 15).

This is believed to be the first time that scientists outside the United States have succeeded in making an element heavier than uranium, number 92, which is the heaviest occurring naturally. Announcement of the discovery of element 100 by a University of California group led by Nobelist Glenn T. Seaborg was made last February, but the date of their work was not given. (See SNL, March 6, p. 147.)

The Swedish scientists report that their "first positive results were obtained" on Feb. 19. They made an isotope of the element 100 by bombarding the A-bomb element, uranium, with charged oxygen particles in a cyclotron. The isotope has a half life of about half an hour, Drs. Hugo Atterling, Wilhelm Forsling, Lennart W. Holm, Lars Melander and Bjorn Astrom of the Nobel Institute of Physics, Stockholm, report.

Use of oxygen as a bombarding particle in cyclotrons is a recent process. Other heavy particles, such as carbon and nitrogen, have also been used in place of hydrogen and helium. (See SNL, Feb. 20, p. 115.)

The Swedish scientists made the element 100 with oxygen ions having energies of 180,000,000 electron volts. The uranium was forced to take on, in one step, the eight protons necessary to change it into the new element number 100, in the institute's 225-centimeter cyclotron. It was identified by its alpha activity, about 20 alpha disintegrations of 7,700,000 electron volts usually being found. The probable mass number, they state, is 250.

Science News Letter, August 7, 1954

BLIND-TEACHING DEVICES—Shown here are some of the special appliances used in teaching the blind. Dr. P. C. Potts of the American Foundation for the Blind, New York, is looking over a carpenter's rule, microgage, measuring cup, thermometer, slide rule, chess set, protractor and some of the other devices especially developed for this purpose.

GENETICS

Tendency to Leukemia

► A TENDENCY to leukemia may be part of the genetic make-up of a person.

That this is true for mice, at least, appears from studies by Dr. Elizabeth Fekete and Miss Hope Otis of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

Their studies were designed to rule out all factors in the environment, so that only those present in the genes of the mice would be operating.

The scientists took baby mice of a strain with a high tendency to leukemia from their mothers by caesarean operation and had them foster nursed by mice of a strain with low tendency to leukemia. However, the baby mice developed leukemia at the same rate as their ancestral strain.

Then the scientists removed fertilized mouse ova from a high leukemia strain and transplanted them into the wombs of mice of a low leukemia tendency. The young that developed in this foster environment and were nursed by their foster mothers of low leukemia tendency also showed the high leukemia tendency. The disease developed in 80% of these mice and their descendants, they report in *Cancer Research* (July).

Some scientists theorize that leukemia is caused by some filterable agent which is passed on from parent to offspring. This is true in the case of breast cancer in mice which has been found to be transmitted by some agent in the mother's milk.

The Jackson Laboratory investigators cannot say, from the present study, that there is no filterable agent in the case of lymphatic leukemia. They do, however, state that if leukemia is caused by such an agent, that agent must be present in the germ cells (egg and sperm).

Science News Letter, August 7, 1954

PUBLIC HEALTH

Keep Food Cold

► KEEP FOOD cold, including cooked food, on hot summer days. This is not just a question of wanting everything cold when you feel hot. It is for the protection of yourself and your family or anyone else eating the food.

Cooked food accounts for most cases of food poisoning in hot summer weather, U. S. Department of Agriculture bacteriologists say. Most trouble, they say, comes from food cooked in advance and then not chilled promptly and kept chilled.

Cooking makes many foods, especially the protein foods, more soft and moist for easier growth of bacteria. A toxin, or poison, given off as the bacteria grow in the food causes the sickness in those eating such contaminated food.

The "stewed" chicken that stands in its broth overnight on the kitchen table, or the stuffed hard-cooked eggs that waited several hours in the picnic basket, or the unrefrigerated cream-filled or custard-filled cakes or pastries are spoilage hazards. All too often food prepared in quantity for community picnics or other get-togethers is not safeguarded by adequate refrigeration.

For safety, chill food as promptly as possible after cooking and keep it at 40 degrees Fahrenheit or colder—that is, at good refrigeration temperature—until served or until reheated for serving.

If you are making a quantity of a mixed salad containing such foods as meat, eggs, fish or poultry for a big party, refrigerate it in small containers instead of one big one. If you put it in the refrigerator in a big container, chilling may be so slow that spoilage will occur in the center.

If you are using frozen cooked foods, guard against spoilage during thawing. If the food takes as long as three to four hours to thaw at room temperature, there may be spoilage. Better thaw such food in the refrigerator.

Remember, also, to wash hands before touching or handling any food. See that your helpers do the same. Liquid soap containing a germicide is highly recommended for hands that prepare food for large gatherings.

Science News Letter, August 7, 1954

PUBLIC HEALTH

Cleanliness Helps To Eliminate Flies

► MODERN INSECTICIDES, from DDT on through the list, have helped enormously in keeping us free from the menace and nuisance of flies and mosquitoes. However, these so-called miracle workers cannot do the whole job by themselves. Hygienic practices and cleanliness are still needed, the Illinois State Medical Society points out.

Homes that are not kept clean are a big menace to human health. Garbage standing in kitchens, and soiled dishes are an invitation to insects, particularly flies and cockroaches.

Flies can carry germs of thirty or more diseases, including typhoid, dysentery, cholera, diarrhea and tuberculosis.

As many as 25,000,000 germs have been found on one fly's body. Because of the characteristic regurgitation of the fly before feeding, the cause of "fly specks" on their resting places, food standing about in uncovered dishes may be heavily contaminated.

Dysentery germs, for example, may live in the intestines of the fly for about five days. Since the travel distance of a fly is about eight miles in one day, one can readily understand the danger.

Every effort should be made to cover breeding places of flies and mosquitoes, preventing the larvae or young of these insects from growing to their stage of maturity when they can fly about. Garbage cans and manure heaps are likely breeding places for flies; stagnant pools of water are favorite breeding place for mosquitoes.

Old cans or bottles, roof drains, lily ponds, sewer basins and similar water should be hunted out and sprayed with an insecticide.

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METEOROLOGY

Cities 20 Degrees Hotter

Temperature difference of 20 degrees Fahrenheit found in San Francisco between city center and undeveloped land in Golden Gate Park.

► THE SUBURBANITE who claims he can feel a 15- or 20-degree drop in temperature as he drives out of the sweltering city is right. Scientists have now measured temperature variations from city center to suburbs and find a 20-degree difference in at least one case.

The cities whose temperatures were taken officially are San Francisco, Palo Alto and San Jose, Calif. The 20-degree Fahrenheit difference was recorded between the densely built-up business district in San Francisco and the undeveloped land of Golden Gate Park.

Dr. Fowler S. Duckworth, on leave from the U. S. Weather Bureau, and Dr. James S. Sandberg of Stanford University, Calif., took the temperatures as part of a classified study.

Thick clustering of buildings makes downtown sections "heat islands," with fingers that extend outward along built-up business streets. Parks and other open areas offer cool oases in such heat islands.

Many factors can increase temperatures in an urban area, the scientists state. "Most obvious" is man's artificial heating of his dwellings, releasing the energy of coal, fuel oil, gas and electricity to the atmosphere as heat. Smoke pall over a city may increase temperatures by changing the radiation balance. Exhaust fumes from motor vehicles show measurable effects in busy streets.

Even human body furnaces make their own very minute contribution to higher temperatures.

The most important single factor, the scientists point out, appears to be the physical structure of a city, the tall concrete and brick buildings crowded together between cement and asphalt pavements. Such buildings have a high heat capacity, and can store much solar heat during the day and liberate it at night. This effect, they conclude, accounts "for well over half of most observed urban temperature differences."

Their studies gave a three-dimensional picture of the temperature changes from suburb to business district from the ground up to the 1,000-foot level. Automobiles with temperature-measuring devices on poles attached to their front bumpers gave readings six and a half feet above the ground. Temperature variations up to 1,000 feet were taken by balloon-mounted equipment simultaneously at urban centers and open areas.

No matter what the weather conditions, a characteristic temperature pattern near the ground was found for each city. The temperatures increased from bordering open land to the built-up center in direct proportion to structure density.

However, they found that the air directly above any particular point in a built-up area sometimes gave lower temperature readings than air above an open spot in the surrounding country.

At some point between 100 and 300 feet, the temperature readings over built-up and undeveloped areas usually were the same. This, the scientists say, indicates a possible limit to the direct effect of heating from city buildings. The limiting point was approximately three times as high as the roof level over which the temperature was measured.

Drs. Duckworth and Sandberg have no explanation, as yet, for why the cooler air can sometimes be found above built-up areas. Vertical mixing, a convection cell in the city, or radiation loss because of smoke and carbon dioxide might contribute to this effect, they suggest.

Drs. P. A. Leighton, W. A. Perkins, S. W. Grinnell, F. X. Webster, and R. W. McMullen of Stanford University's department of chemistry cooperated in the study, which is reported in the *Bulletin of the American Meteorological Society* (May).

Science News Letter, August 7, 1954

ASTRONOMY

Blazing Star Spotted in Heavens

► A NOVA, or new star, has blazed forth in the heavens. Its outer shell is expanding at a high rate, several hundred thousand miles per hour, but further observations will be required before the speed can be pinned down more exactly.

The suddenly brilliant object can be seen in the constellation of Ophiuchus, the serpent holder, visible low on the southern horizon in the early evening hours. Its magnitude is now about nine, so it can be seen with a small telescope.

This nova is the second to be spotted during July in this region of the sky. (See SNL, July 17, p. 36.) Its location, based on 1875 celestial coordinates, is 17 hours, 20.8 minutes in right ascension, minus 27 degrees, 39 minutes in declination.

The object was discovered on July 21 by Dr. Victor Blanco of the Warner-Swasey Observatory, Cleveland, on infrared spectrum plates taken July 2. News of its discovery has been telegraphed to observatories throughout the country by Harvard College Observatory, Cambridge, Mass., clearing house for astronomical messages in the Western Hemisphere.

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BLADED NOZZLE — High-velocity water flowing through a transparent plastic nozzle is used by engineers at General Motors to study effects of turbine blade shapes and angles for possible use in automobile torque converters and automatic transmissions.

ARCHAEOLOGY

Find Ancient Village in Arctic

► BURIED IN the frozen ground of the eastern Arctic are the remains of an entire village of more than 100 houses last occupied more than 1,000 years ago.

The village, discovered by a team of archaeologists from the University of Pennsylvania Museum and the National Museum of Denmark, is expected to yield valuable information about the little known Dorset era and the people who lived in it. Their culture was distinct from and older than that of the whale-hunting Thule Eskimos of the eastern Arctic.

The Dorset village remains are the largest archaeological site thus far found in the eastern Arctic. The site is about 80 miles north of the Arctic Circle on the Melville Peninsula in Canada's Northwest Territories. Discovery of the site was announced by Dr. Froelich G. Rainey, director of the University of Pennsylvania Museum. The expedition is headed by Jorgen Meldgaard, Danish archaeologist, who is assisted by Richard Emerick.

Test excavations already have revealed the presence of more than 100 houses, in addition to graves, implements and other finds, which identify the site as belonging exclusively to the Dorset cultural era.

Included are organic remnants containing abundant carbon. Such organic remains will enable scientists to date them through radiocarbon 14 analysis.

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MATHEMATICS

Arithmetic Easier Nowadays

Children can learn to add, subtract, multiply and divide before they can write the numbers by a new teaching method that concentrates on arithmetic of concrete objects.

By WATSON DAVIS

➤ OF THE time-honored three R's —reading, writing and 'rithmetic—arithmetic has long been the worst headache, not only for children, but for teachers.

The trouble is the way it has been taught. That is what the educational experts of Teachers College, Columbia University, believe and they have demonstrated it.

Prof. Howard F. Fehr, head of the mathematics department at this famous educational institution, has demonstrated through several years of experience that arithmetic is easy to learn when the children are taught what the numbers mean.

There is no more starting in with 2 plus 2 equals 4, and 4 plus 4 equals 8. Instead, the teaching trick is to show that two things and two more things are four things. The children learn their arithmetic by using objects. They may be pennies, nickles or dimes. Or they may be dolls, balls, pegs, rings, books, sticks or almost any combination of things that can be arranged and rearranged in different groups.

Even counting on one's fingers is not taboo in this new educational method.

The method is in one sense quite old fashioned and extremely logical. For numbers are used to represent things or groups of things. It is only because we get so used to them and take it for granted that they represent things that we think of numbers as abstract entities in themselves.

Memorizing Tables Wrong

It is all wrong, say the educators, to attempt to have children memorize those multiplication tables until they do understand and realize that numbers are simply useful symbols.

The development approach to arithmetic, which the new method is called, has already had some five years of experience in the New York City school system, and it is being adopted throughout New York City and other areas as fast as teachers learn how to teach it.

With the fortunate children who acquire their arithmetic by the new method, arithmetic becomes a game. Often the problems are acted out. Learning becomes fun instead of a lesson.

It is not recess and yet a group of boys and girls are actually playing with shiny colored balls. Two balls are taken away from a group of five. This is subtraction. One of the youngsters rolls a ball into the group. That is addition. And now a group of six balls is separated into two groups of three balls each. This is division. If you have a number of groups of five balls each, for instance, and two or more of them are combined, that is multiplication.

The idea is to present arithmetic as concretely as possible. The new kind of teaching is aimed at having children study and think out situations, not just learn things by rote. Thus, the children begin to understand and develop the mathematical concepts clearly.

Only later do they make written computations and much later they apply what they learned so pleasantly to their own lives, figuring out their little budgets, helping to do the family shopping and keeping scores for their own games.

All the old memorizing and drills and the reciting of tables have not disappeared by any means, but those doing the new mathematical teaching realize that only after children understand numerical facts does memorizing have meaning.

If a child forgets some numerical fact, some item in the multiplication table, such as 3 times 6 equals 18, he can actually sit down and work it out for himself, allowing logic and reasoning and experience to substitute for memory.

Interest in the new system grew as it was discovered that an increasing number of children were reaching high school unable to understand more advanced mathematics, and many were having difficulty in using ordinary arithmetic in their jobs.

The new system is designed to give students a basic understanding of mathematics as a way of thinking, which will be more permanent and adaptable than memorized skills.

"One of the reasons why arithmetic has been traditionally difficult to teach and learn is that the subject, even at the elementary level, is a science requiring abstract thinking," Prof. Fehr explained.

"Teaching arithmetic so that children can learn abstract ideas from it means that it must be explained logically. The sequence is from many simple and varied experiences with concrete things, to pictures of things, and to more complex mathematical relationships and problems."

Children find numbers, on paper, hard to understand. Every adult is familiar with the number four, but a child must learn to think out the meaning of "fourness" from a variety of experiences. He must learn to recognize four wherever it occurs

THE NEW ARITHMETIC—Clothespins help 7-year old Johnny Morris see the answer to a problem in addition. Prof. Howard F. Fehr of Teachers College, Columbia University, finds that if physical objects are used to show what numbers stand for, children will learn basic arithmetic easier than if they merely memorize tables and facts.

PRAYING MANTIS—For its size, this insect is one of the most predatory animals in existence. The prayerlike pose of the praying mantis, a near relative of the cockroach, is its normal position for seizing prey.

—four cents, four legs of a chair or four apples. In earlier grades, he may work out these relationships with beads, blocks, sticks or other objects. As he grows, he can use numbers in problems without specifically applying them to the things they represent.

Teaching a child to understand number relationships in this way is made as practical as possible. For example, an important part of arithmetic is the study of measurements in pounds, quarts, minutes and miles. Under the old rote system, these measurements were memorized after the child had become familiar with numbers and before he had had experience with the measurements themselves.

Now, a child's first arithmetic lesson starts in kindergarten, where he learns general ideas of measurement — heaviness or lightness, hot or cold — through class experiences. In the next grades, he learns to measure with more exactness, using the numbers he knows. He pours two pints of water into the class aquarium, or measures a piece of cardboard for a doll house.

In each class, he learns to handle more complex measurements of time, space and objects. He learns to tell the time, to buy and sell in the class "store," to keep score in class games and races, or to check weather temperatures.

From his experience in using measurements, he becomes more skillful in understanding them and in developing the tables of measure. In each class, he uses more advanced methods, starting with whole numbers, then common fractions and, finally, decimal fractions.

This kind of teaching will cause the child to like arithmetic. He will remember the principles involved even after he has forgotten specific skills. Of all types of learning, skills are the most likely to be forgotten unless practiced.

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VETERINARY MEDICINE

Destroy Parasitic Grubs

Cattle grubs, which cause up to $300,000,000 worth of damage to meat, milk and hides annually, are killed in animals injected with organic phosphorus insecticides.

➤ ORGANIC PHOSPHORUS insecticides, fed to or injected into livestock, have killed cattle grubs in tests at the U. S. Agricultural Research Service laboratory, Kerrville, Tex.

If further tests prove the insecticides to be effective and without toxic effect on the meat or milk of the cattle, a method will be at hand to rid the U. S. of a pest that causes up to $300,000,000 damage to meat, milk and hides annually.

The new insecticides are diazinon, chlorthion and a dialkyl phosphate.

The scientists' problem has been to find a chemical that will kill the grub early in its nine-month life inside the cattle before the grub can do much damage.

External insecticides available today kill the grubs only after they have emerged through the hide on the back of the cattle.

Since the damage to the livestock has already been completed by the time the grub emerges, these insecticides are not usually of value unless applied to a whole area, such as an island, which cannot become reinfested. In such a case, future herds will probably not be bothered by the pests.

Other internal insecticides have been found to cause toxic chemical residues in the meat or milk of the treated animals. Scientists hope the phosphate residues will disappear from cattle very quickly as they do from treated plants.

Only time and many tests will show whether the new insecticides are truly effective and safe. Practical, widespread use of them is not to be expected in the very near future.

The cattle grub has infested cattle in America ever since the first livestock were imported from Europe.

The adults or heel flies, which are about half an inch long, lay eggs on the ankles of the cattle during spring and summer. These flies disturb and frighten livestock, sometimes causing stampedes in which the animals are seriously injured.

The eggs soon hatch and white grubs, or larvae, burrow into the ankles and internally through the body for about nine months. At this time they form cysts on the backs of the livestock after cutting a hole through their valuable skins.

In five to seven weeks the larvae, now fully matured, drop to the ground and form pupal cases from which another generation of heel flies comes forth.

One of the few places in which the insects have been practically eliminated is Clare Island, off the coast of Ireland. Their destruction came in 1920 as the result of a five-year cooperative movement. At that time the cattlemen had to squeeze the larvae from the cysts on the cattle by hand to destroy them.

Reinfestation of Clare Island has not occurred because heel flies do not operate over large bodies of water.

Science News Letter, August 7, 1954

SURGERY

Nerve Cutting Helps Older Patients, Too

➤ PATIENTS OVER 65 with artery trouble as well as younger ones can be helped by an operation in which certain nerves of the sympathetic system are cut, in the opinion of Dr. Herbert J. Movius II of Long Beach, Calif.

Results were better than expected in 43 patients aged 65 to 83 years, he reports in the *California Medicine* (July).

Of the 43 patients, 19 had an "excellent" result from the operation. Results were fair in 13 and poor in four. One patient died shortly after the operation and six died later.

The results were judged by one or another of three physicians who examined the patients from time to time in the six months to five and a half years since the operations.

The operation was judged worthwhile by 34 patients, with only two saying it was "no good."

The artery trouble the patients suffered is known medically as arteriosclerosis obliterans. In this condition, the artery walls have gotten so thick, inelastic and hard that not enough blood can get through the artery. Gangrene from lack of nourishment to the affected tissues may result. Pain in walking, sometimes inability to walk, and cold feet and legs are other symptoms.

The nerve cutting operation to allow relaxation of the artery walls and thus increase the blood supply has heretofore been limited to younger patients, Dr. Movius points out. However, he says, "a great number past 65" need help but have been denied the operation on the basis of age alone.

In 12 patients, he reports, the operation was done only on one side, that of the more severely affected leg. These patients, six months to four years after, asked for the operation on the other side because they had had relief of symptoms or arrest of the progress of the disease on the affected side.

Of the 43 patients, 24 could walk farther after the operation before pain stopped them and 13 were able to work again.

Science News Letter, August 7, 1954

TECHNOLOGY

Develop Rubber "Cans" For Shipping Chemicals

➤ REUSABLE, COLLAPSIBLE synthetic-rubber "cans" have been developed for industrial shipment of foods, chemicals and corrosives. They are said to cut handling and packaging costs and permit low-cost bulk shipments.

Made by the U. S. Rubber Company, the "cans" now are carrying carbon black, starch, clay, flour, sugar, malt, granular reclaim rubber, corrosive chemicals and plastics.

The large, 2,500-gallon container measures eight feet in diameter. Inflated it stands eight feet high, but it collapses to two feet for return and refill.

The small, 500-gallon container is three feet, ten inches in diameter and seven feet high. It collapses into a package about six feet long, three feet wide and ten inches high.

Fabricated like tires, the containers have a number of plies of high-strength cord molded into the neoprene rubber walls. They are reinforced by internal lifting cables attached to a lifting ring on top.

Science News Letter, August 7, 1954

INVENTION

Convertible Helicopter Wins Patent for Piasecki

➤ THE U. S. Patent Office has given protection to two notable inventions in the field of aeronautics.

One is a Piasecki helicopter with a saucer-like rotary wing. The other is a Danish transport plane with a detachable cabin that can parachute to earth should the plane run into trouble.

Edward G. Vanderlip of Radnor, Pa., is the inventor of the "disk rotor" helicopter. This machine is capable of rising vertically and hovering like ordinary helicopters, but it has been designed to fly forward at speeds faster than ordinary helicopters can reach.

Usual types of helicopter rotor blades extend from the hollow circular wings, which resemble two saucers, one inverted upon the other. The rotor blades lift the helicopter from the ground.

In flight the rotor blades can be retracted into the spinning saucer-like wing to permit fast forward speeds. The saucer wing is an airfoil that will support the helicopter in horizontal flight despite its unconventional design.

The helicopter would have a piston-driven propeller to pull the plane forward or would use a jet engine to generate a forward thrust. Mr. Vanderlip assigned patent No. 2,684,212 to Piasecki Helicopter Corporation.

Martin Olgaard Thunbo of Copenhagen has patented his method of protecting transport passengers in case of a catastrophe. He provides a cabin for passengers that has a huge parachute packed on top of it. Small "pilot" chutes are attached to the big one. The whole works is encased by the plane's skin.

In an emergency, the pilot would enter the passenger's cabin, close the water-tight door leading to the cockpit, pull an emergency lever and try to reassure passengers.

The skin covering the cabin would rip away. One small parachute would billow open and would begin sliding the cabin away from the rest of the plane. Other small chutes would open one by one, then the big chute would blossom. The cabin at this point would be completely free of the ill-fated plane and would come gently to earth, Mr. Thunbo believes. The cabin would float should it land in water. Patent No. 2,684,219 was not assigned to any manufacturer.

Science News Letter, August 7, 1954

TECHNOLOGY

Studebaker Introduces Ambulance-Police Car

➤ A MODIFIED station wagon for use as a combination ambulance, patrol car and emergency vehicle has been developed for small communities and factories that have no need for three separate vehicles.

During emergency runs, a siren can be operated through the automobile's horn ring. Half of the rear seat folds down to make room for an ambulance cot. Left up, the other half of the seat permits an attendant to sit at the head of the cot.

All emergency equipment, including siren and revolving beacon, may be quickly removed when the vehicle is used to carry personnel. It was developed by engineers of the Studebaker Company, South Bend, Ind.

Science News Letter, August 7, 1954

OCEANOGRAPHY

Sea Creatures Seek Level of Deep Shade

➤ THE TINY sea creatures that make up the ocean's deep-scattering layer spend daylight hours at a level where the sun gives no more light than would a 100-watt light half a mile away.

Scientists have, for the first time, found a direct relation between a fixed amount of light and the depth of the deep-scattering layer. This layer was discovered during World War II when "false bottoms" appeared on depth tracings made by sound waves reflected from the ocean floor.

Drs. Brian P. and Elizabeth K. Boden of the University of California's Scripps Institution of Oceanography have proved that the light intensity within the deep-scattering layer is only three ten-thousandths of a foot-candle.

A 100-watt light emits 16 foot-candles at a distance of 10 feet. They used a photometer, a sensitive light-measuring instrument, to pinpoint the depth of the deep-scattering layer.

Science News Letter, August 7, 1954

IN SCIEN

PLANT PATHOLOGY

Smogged Plants Glow Blue in Ultraviolet

➤ PLANTS ATTACKED by smog will glow with a bright pale blue fluorescence when seen under ultraviolet light.

This discovery, if confirmed, will give "the first objective means" of telling how much damage smog has caused on vegetation as well as ornamental plants.

The finding and its potential value are announced by Drs. J. P. Nielsen and H. M. Benedict of Stanford Research Institute and Dr. A. J. Holloman, now with the Columbia-Geneva Steel Division of U. S. Steel Corporation at Provo, Utah, in *Science* (July 30).

Smog damage to leafy crops in the Los Angeles area is reported to be more than half a million dollars a year. The area of damage is expanding. Leaf markings pointing to smog damage have now also been found in the San Francisco Bay area.

In addition to the commonly recognized smog markings on plant leaves, there may be other marks commonly seen that cannot be readily told from the smog markings. These other markings may come from insects, under- and over-fertilization, floods and similar non-smog causes.

After a smog attack in Menlo Park, Calif., in 1953, it was discovered that the so-called typical smog markings on leaves of some plants fluoresced pale blue when irradiated with near ultraviolet light from a mercury vapor lamp.

Following this discovery, the Stanford Research Institute scientists made tests of plant leaves exposed to actual smog, to atmospheres made to resemble smog and to a variety of cultural conditions.

Science News Letter, August 7, 1954

ASTRONOMY

Faint Periodic Comet Arrives on Schedule

➤ A PERIODIC comet that has been sighted every six and a half years since its discovery in 1928 has been spotted close to its predicted position by two Lick Observatory astronomers, Harvard College Observatory has reported.

Known as Comet Schwassmann-Wachmann (2), the diffuse object is only of 17th magnitude, too faint to be seen without a large telescope. It was spotted in the constellation of Taurus, the bull, which is low in the northeast after midnight.

The comet was rediscovered on July 28 jointly by Drs. Hamilton Jeffers and Elizabeth Roemer of Lick Observatory, Mt. Hamilton, Calif.

Science News Letter, August 7, 1954

CE FIELDS

NUTRITION

Capsules, Gum Drops In Protein Test Diet

➤ SIX COEDS have lived on a daily diet that consisted of gum drops, a muffin, butterscotch pudding, soda pop, and capsules of vitamins, minerals and amino acids.

This kind of Spartan eating for six weeks helped scientists learn more about the body's protein requirements at the University of California at Los Angeles.

Such a diet will not aid housewives trying to stretch the family budget, however. Because of the rare amino acids in the capsules, each girl's food per day cost about $50.

Dr. Marian E. Swendseid of the department of home economics directed the experiment, planned to find out which of the approximately 20 amino acids in food are necessary to a healthy diet. Amino acids are the basic constituents of protein. The research was financed by grant from the U. S. Department of Agriculture.

Science News Letter, August 7, 1954

ANIMAL NUTRITION

Good Food For Family Dog

➤ IF YOU are buying canned food for your pet dog, look for a keystone-shaped design on the can label that carries the words: "Inspected and certified by U. S. Department of Agriculture as a normal maintenance dog food."

Dr. D. W. Glascock, in charge of inspection of animal foods, explains that the symbol means that Federal inspectors have checked both quality and ingredients of the food, and that all information on the label is accurate. It means that food is of such high quality that a partly used can may be kept in the refrigerator along with the family's foods, and also that the mixture is a balanced ration, meeting a dog's minimum needs or better for protein, vitamins, minerals and other nutrients.

As a further check, the food is tried out on dogs in a three months' feeding test to see if they maintain health and weight on it. If dogs do not fare well, manufacturers are helped to improve their formula. This protects against food that may fill but does not fully nourish.

The many canned dog foods on sale vary considerably in nutritive value, and price is not always a sure guide to the best product. Feeding tests at the U. S. Department of Agriculture have shown that a dog may need twice as much of one canned mixture as another to hold his weight.

Labels on inspected dog food state that the food is for dogs, list all ingredients, give the correct net weight of the can, and the name and address of the manufacturer. Besides certifying the food and label, inspectors examine the filling and processing of cans and sanitation of canning plants and equipment.

All this service costs the taxpayer nothing. Manufacturers who ask for it pay for it. Dogs and owners benefit as do those manufacturers who know it is good business to put out good food for "man's best friend."

Science News Letter, August 7, 1954

DENTISTRY

Fluorides and Ammonia Rated Against Caries

➤ FLUORIDE PUT into the drinking water of the Canadian city of Brantford, Ont., for the past nine years has cut tooth decay more than half in permanent teeth of boys and girls from five to 15 years old, Dr. William L. Hutton, director of the Brant County Health Unit, Dr. Bradley W. Linscott, school dental officer, and Donald B. Williams, chemist of the Brantford water works, report in the *Journal of the American Dental Association* (Aug.).

Brushing teeth with an ammoniated dentifrice twice a day reduced new decay spots by 25.2%, Drs. Abram Cohen and Albert Donzanti of Philadelphia's School District report in the same issue.

Their report was based on a two-year study of 169 grade school children who did the tooth brushing at school under supervision.

X-ray studies showing that fluoridated water did not damage the bone structure of children who drank it are also reported in the same issue by Dr. F. J. McClure of the National Institute of Dental Research and Dr. H. Berton McCauley, formerly with the institute and now with the Baltimore City Health Department.

Science News Letter, August 7, 1954

ICHTHYOLOGY

Eavesdropping on Fish Proves They Are Noisy

➤ EELS MAKE "putt putt" sounds, striped bass go "thump," and seahorses click.

The concept of the undersea world as a noisy place has received added support from studies conducted by Mrs. Marie Poland Fish, research biological oceanographer of the University of Rhode Island's Narragansett Marine Laboratory, who used a hydrophone and a sound recorder to eavesdrop on 60 North Atlantic coastal fishes. Only six uttered no sounds.

Mrs. Fish found that fish, like humans, use sounds to "talk" to one another, express fright, comment on changes in their surroundings, or just make noise.

Air bladders or friction of one part of the body against another were the noise makers for 27 kinds of fish examined.

Science News Letter, August 7, 1954

MEDICINE

Keep Problem Drinker On Job Three Months

➤ KEEP THE problem drinker in your plant on the job while your medical people are trying to help him. But if after three months the medical division or plant doctor reports the drinker shows no interest in rehabilitation, he should be discharged.

This advice comes from Dr. Thomas H. Hogshead of E. I. du Pont de Nemours and Co., Wilmington, Del.

Following this policy has resulted in rehabilitation of an estimated 65% of the cases at an estimated cost of less than $100,000, he reports in the American Medical Association's *Archives of Industrial Hygiene and Occupational Medicine* (June).

Allowing the employee to keep working while he tries to stop drinking is like the successful treatment of World War II casualties at the front instead of at rear bases, Dr. Hogshead explains. It gives the worker, like the soldier, "the feeling of courage and pride that one gets by staying in the fight and not retreating."

Science News Letter, August 7, 1954

MEDICINE

Streptomycin Cures Repeated TB Meningitis

➤ EVEN REPEATED attacks of tuberculosis meningitis can now be cured by streptomycin. And women afflicted by this serious illness need not be denied the pleasure of becoming mothers.

This view of a once hopeless situation comes from a case reported by Drs. Archibald L. Hoyne and Allen Schultz of Chicago and Dr. Jerome H. Diamond of South San Francisco, Calif., in the *Journal of the American Medical Association* (July 31).

Their patient was 15 when first admitted to Cook County Hospital, Chicago, suffering with tuberculosis meningitis. TB germs had attacked the membranes covering her brain and spinal cord. In this kind of meningitis, an apparently recovered patient is sometimes left subnormal mentally or with paralysis.

The 15-year-old Chicago girl recovered from her first attack, only to have two more within the year. Treatment with streptomycin restored her to health each time.

Since the last attack, in September, 1948, she has remained well and become the mother of three "robust, healthy children."

Her case is considered one of the most prolonged instances of treatment with complete recovery from the disease since streptomycin was first used for tuberculosis. Although such long time treatment with streptomycin carries danger of nerve damage resulting in partial or complete loss of hearing, the Chicago young woman has no trouble in hearing. Audiogram records show only a moderate loss in the high range above the range of the normal voice.

Science News Letter, August 7, 1954

ASTRONOMY

Cosmic Debris Bombs Earth

Interplanetary warfare has been going on for millions of years. In destructive power, this barrage beats every man-made weapon under the sun.

By JAMES MELLEN
Science Service Correspondent

➤ EVERY DAY millions of potential death dealers from outer space head for earth with murderous speed and precision, zooming through space to burst into our atmosphere—only to fizzle and spark into a multitude of flaming streaks.

Smugly, learned men contemplate a particularly brilliant specimen of these flaming streaks in the sky and record in their books another meteor.

Nature, in allowing mortals this smugness, has been kind. Against the incessant barrage of cosmic bombings, she has provided us with an armor tougher than the thickest steel. This armor we call air.

Meteors are believed to be the flying debris left by comets. When meteors run into earth in the course of their adventures in space, the earth's gravitation attracts them at speeds of eight to 50 miles per second—up to 3,500 times as fast as a cruising car.

Shadow-Casting Fireball

As these meteors pierce the 200-mile-thick cushion of air which is our atmosphere, they meet the formidable resistance of billions of molecules of gas every cubic inch. The strain is too great. The meteor disintegrates and, in a few seconds, nothing is left of an ordinary meteor but a trail of fire. If a meteor's trail is bright enough to cast a shadow, it is called a fireball.

Does this disappearance mean we are safe from the danger of meteoric bombardment? From ordinary meteors we are, but when a big one falls, and at least several hundred do fall every year, look out! Men have seen swarms of such big meteorites rock the earth; they have collected big hunks of meteorites; they have found huge gaping holes in the earth, called meteor craters.

Astronomers call the object in the sky a meteor; the meteor body when it reaches the earth, a meteorite.

In 1908, a central Siberian area of wooded shallow swamps was struck with such smashing fury that a great "pillar of fire" was visible to villagers for miles around. The ensuing rumble was heard over 600 miles away. Pressure waves in the atmosphere were recorded as far off as England. Nearby villages suffered the combined effects of an earthquake, tornado and flood.

When the first scientist to make any observations of the devastated area, Russian meteoriticist Dr. L. A. Kulik, arrived on the scene about 18 years later, he found the scarred area full of large water-filled holes, the biggest of them 150 feet across.

From his observations and eye-witness accounts, he estimated that some 40,000 tons of meteoritic material in one great swarm had bombed the bleak Siberian swampland.

Although there are a few records of deaths due to meteorite falls since as early as 1511, this Siberian holocaust appears the best example yet known of the violence of cosmic forces come to earth.

Had the meteorites landed four hours, 37 minutes later, they would have scored a bull's eye on Leningrad, wiping out the city and its inhabitants as effectively as several hydrogen bombs.

Other cities have had close shaves, as the following newspaper headlines in recent years show:

"Meteor Big Enough to Destroy City Bursts Over Seattle."

"Pittsburgh Barely Missed Annihilation June 24, 1938."

"Early Morning Mystery Blast Rocks 6-State Eastern Area."

Cases of small meteorites observed to hit cars, house roofs or to land in bushes or fields are quite common. The biggest known meteorite seen to fall landed in Arkansas on Feb. 17, 1930. It weighed 820 pounds. Other pieces found in the area weighed 80 pounds or less.

At a height of 10 miles, the meteorite was seen to break into three pieces. All were lost to view at a height of five miles. The big piece was found three weeks later in clay soil, where it had gouged a hole more than eight feet deep. The clay was scattered for 50 yards around.

COSMIC FRAGMENT—From the amount of radium, helium and lead this fragment of the Canyon Diablo meteorite contains, scientists estimate its age as 100,000,000 years. It crashed to the earth, however, only in geologically recent time.

Identification of Celestial Matter

When meteorites are not seen to fall, some speculation on their origin is involved. However, identification of celestial matter is not very difficult and can usually be made by studying its internal structure and chemical composition.

Meteorites fall roughly into two groups: the siderites, which are entirely composed of metal, mostly iron; and aerolites, which are largely stone. In-between meteorites, which are half metal and half stone, are siderolites.

The biggest known meteorite, which may have fallen long ago, weighs about 35 tons, and still lies where it was found in Hoba West, near Grootfontein, South Africa. It measures about ten by nine by three feet.

The next largest, only a little smaller than the Hoba West meteorite, was brought from Cape York, Greenland, to New York by Admiral Peary, and is now on display there in the Hayden Planetarium. Looking like polished steel, it is 92% iron and nearly eight percent nickel.

Origin of Giant Craters

Mystifying as meteorite specimens may be, probably nature's strangest "whodunits" are the 100-odd giant craters that man has found, usually by accident. These, fortunately, are found in out-of-the-way places. They are assumed to have been formed when great meteorites, or showers of them, hit earth.

Whether such meteorites just plowed into the earth with their huge mass settling underneath the holes they carved, or whether they exploded upon impact because of the great heat generated, thus sending out a "tidal wave" of air and shower of debris sufficient to form craters, has been a hotly debated question.

The latter theory is rapidly gaining ground, one reason being that large masses of meteorite have not been found underneath craters.

Canyon Diablo, in the outermost fringe of Arizona's painted desert, was discovered around 1890. Today it is known as Meteor Crater. It once had the reputation of being the world's largest imprint of celestial force,

but now its claim to being largest is being questioned.

The likely absence of a main mass, plus the fact that several million tons of meteorite would have fallen under the "plowing theory," lead scientists to think that a meteoritic explosion took place, hurling cosmic shrapnel over the desert.

"There is no main mass," meteorite expert Dr. H. H. Ninninger says.

The present record holder for the world's largest hole in the earth supposed to have been formed by crashing meteorites is Chubb Crater in northernmost Quebec. It is an immense, round-rimmed lake in a bed of impacted subarctic granite.

The circumference of the granite rims is 6.8 miles, that of the lake shoreline, 5.4 miles. The almost perfectly circular lake has a maximum depth of 825 feet, and its surface is 500 feet below the top level of the rim.

Canadian geologist Dr. Victor Ben Meen, has studied the crater, has not found any meteoritic specimens there, although magnetic instruments indicate the possibility of a big chunk of iron lying below the lake. Definite proof of its meteoritic origin is lacking, but if this origin is denied, an extreme geological phenomenon is required to explain how 10,000,000,000 tons of rock were gouged out of the face of the earth, to be replaced by a mammoth water-filled basin.

Dr. Meen has said that if a meteoritic body similar to that which could have caused Chubb Crater were to strike Manhattan Island, "the city would be torn from the earth and life would be eliminated within a radius of 100 miles by the shock waves; the crust of the earth would ripple like pond water."

The meteor swarm that missed Leningrad by a few hours was just a baby compared to what must have dropped over Arizona.

Yet in spite of these dire facts, this remains true: no single, man-afflicting catastrophe attributable to meteorites is on record. Very little of our globe is populated by man; three-quarters of it alone is water.

The chances for a thickly inhabited area to be bombed, therefore, are almost zero—something like one in 200,000,000 for New York, calculations have shown.

Science News Letter, August 7, 1954

MEDICINE

Diagnosing Polio

Accurate diagnosis of poliomyelitis is still extremely difficult, one reason being lack of a practical, reliable and inexpensive laboratory test for it.

➤ POLIO, IN spite of all the attention given to it by scientists and the public, continues to be "one of the most difficult of all diseases to diagnose accurately," Drs. Amos Christie and Randolph Batson of Nashville, Tenn., and Dr. Robert Britt of Evansville, Ind., state in the *Journal of the American Medical Association* (April 24).

One of the difficulties, they point out, is that there is no practical, reliable, inexpensive laboratory test for the disease which all physicians could make or have made.

The laboratory studies usually made need very cautious interpretation, the three doctors warn. Counts of white blood cells do not help much. The spinal fluid white cell count is of much more importance in diagnosing polio.

However, polio patients may have a normal white cell count in their spinal fluid. Protein in the spinal fluid is usually supposed to be elevated in polio, but at least a third of a series of patients the three doctors report on had normal protein values in the spinal fluid when admitted to the hospital.

The history and physical examination are important for diagnosing polio. About half of the patients with polio have a "prodome," that is, a one- to three-day period of symptoms of a cold, stomach upset or slight rigidity of the neck. The polio patient gets over this and seems well for several days before the start of the paralytic, feverish period.

One suspicious sign in polio is the way the patients keep their spine in a rigid, fixed position. If sitting in bed they usually take a "tripod" position with both arms bracing them in back. This sign, however, may be present in any condition that causes irritation of the covering membranes of the brain.

Patients with hysterical reactions due to "poliophobia," or fear of polio, usually have numbness in the arm or leg that shows false paralysis.

During one year, 140 patients with poliomyelitis were admitted to Vanderbilt Hospital, Nashville. Only 10% were diagnosed mistakenly, which the doctors consider a good record.

During the same year, 23 other patients were referred to the same hospital with a diagnosis of polio who actually had other diseases. The diseases that were mistakenly diagnosed as polio included meningococcic meningitis, brain tumor, tick typhus, and hysteria with "poliophobia."

Science News Letter, August 7, 1954

Eight years ago there were less than 200 people employed in manufacturing instruments for *radiation* detection; at the close of 1952, there were 2,500 people thus employed in 75 instrument companies.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

BIOGRAPHICAL MEMOIRS—National Academy of Sciences—*National Academy of Sciences—Columbia University Press,* Vol. 28, 311 p., illus., paper, $4.00. Biographies of outstanding scientists by members of the National Academy of Sciences.

THE CLASSIFICATION OF FIRE HAZARDS AND EXTINCTION METHODS—James D. Birchall—*Ernest Benn Ltd.-John de Graff,* 97 p., paper, $1.50. The development of new materials with the expansion of industry has resulted in an enormous increase in the complexity of the science of fire protection and prevention.

CLAY FIGURINES OF THE AMERICAN SOUTHWEST: With a Description of the New Pillings Find in Northeastern Utah and a Comparison With Certain Other North American Figurines—Noel Morss—*Peabody Museum of American Archaeology and Ethnology,* Papers, Vol. 49, No. 1, 114 p., illus., paper, $3.50.

AN ENGINEERING STUDY OF THE SOUTHERN CALIFORNIA EARTHQUAKE OF JULY 21, 1952 AND ITS AFTERSHOCKS—Karl V. Steinbrugge and Donald F. Moran—*Seismological Society of America,* Bulletin Vol. 44, No. 2B, 260 p., illus., paper, $2.00. A study of the performance of man-made structures when subjected to earthquake shocks.

THE EXPLORATION OF SPACE—Arthur C. Clarke—*Pocket Books,* 210 p., illus., paper, 35 cents. A non-technical book written to answer the questions of the layman about astronautics by a man twice chairman of the British Interplanetary Society.

FUNDAMENTALS OF COLLEGE MATHEMATICS—John C. Brixey and Richard V. Andree—*Holt,* 609 p., $5.90. A first year college text.

GMELINS HANDBUCH DER ANORGAN ISCHEN CHEMIE: Bor, System-Nummer 13, Erganzungsband—Gmelin Institute and E. H. E. Pietsch—*Verlag Chemie,* 253 p., illus., paper $33.60, cloth $34.80. A supplement to the boron volume published in 1926, this book covers the literature for the years 1925-1950.

GMELINS HANDBUCH DER ANORGAN ISCHEN CHEMIE: Gold, System-Nummer 62, Lieferung 2—Gmelin Institute and E. H. E. Pietsch—*Verlag Chemie,* 306 p., illus., paper, $40.32. Part two of a volume, the first part of which was published in 1950.

GMELINS HANDBUCH DER ANORGAN ISCHEN CHEMIE: Gold, System-Nummer 62, Lieferung 3—Gmelin Institute and E. H. E. Pietsch—*Verlag Chemie,* 558 p., illus., paper $74.88. This volume completes the Gmelin Gold series.

GMELINS HANDBUCH DER ANORGAN ISCHEN CHEMIE: Selen, System-Nummer 10, Teil A-Lieferung 3—Gmelin Institute and E. H. E. Pietsch—*Verlag Chemie,* 184 p., illus., paper, $26.64. Devoted to the selenium rectifier and the selenium photocell.

LEGAL MEDICINE—R. B. H. Gradwohl, Ed.—*C. V. Mosby,* 1093 p., illus., $20.00. Authorities in their fields contribute articles on subjects that make up the various aspects of legal medicine.

MEDICAL USES OF CORTISONE: Including Hydrocortisone and Corticotropin—Francis D. W. Lukens—*Blakiston,* 534 p., illus., $7.50. Bringing together in one volume, studies scattered among numerous medical specialties of the actions and uses of cortisone, hydrocortisone and corticotropin.

THE PAINTED MEN—T. C. Lethbridge—*Philosophical Library,* 208 p., illus., $6.00. The story of the Picts, ancient peoples who inhabited the area now called Scotland, by the keeper of the Anglo-Saxon antiquities, Cambridge University Museum of Archaeology and Ethnology.

PHYSICIAN IN THE COURTROOM—Lester Adelson and others, Edited by Oliver Schroeder Jr.—*Western Reserve University Press,* 99 p., $2.00. The first of a series of publications planned for the use of lawyers and physicians by the Law-Medicine Center of Western Reserve University, presenting basic areas of contact between these professions.

SCIENCE FOR HERE AND NOW—Herman and Nina Schneider—*D. C. Heath,* 213 p., illus., $1.92. A well illustrated science text for the second grade school child, including experiments for him to perform.

THE SEXUAL NATURE OF MAN: and Its Management—Clarence Leuba—*Doubleday,* Doubleday Papers in Psychology, 40 p., illus., paper, 85 cents. "The sexual nature of man is still a confused area," the author states in the preface. "We will need to proceed cautiously and to evaluate carefully the sources of our data."

SEPTIC TANK SOIL ABSORPTION SYSTEMS FOR DWELLINGS: A Guide for the Design and Installation of Individual Sewage Disposal Systems—Fred W. McGhan—*Govt. Printing Office,* Housing and Home Finance Agency, Construction Aid 5, 34 p., illus., paper, 25 cents.

SHOCK AND CIRCULATORY HOMEOSTASIS: Transactions of the Third Conference, September 14, 15 and 16, 1953, Princeton, N. J.—Harold D. Green, Ed.—*Josiah Macy, Jr. Foundation,* 230 p., illus., $3.50. Three papers given at a conference sponsored by the Josiah Macy, Jr. Foundation and the discussions that followed their presentations.

WENNER-GREN FOUNDATION FOR ANTHROPOLOGICAL RESEARCH INCORPORATED: Report on the Foundation's Activities for the Year Ended January 31, 1954, 14 East 71st St., New York 21, N. Y., 83 p., illus., paper, free upon request to publisher. The principal activity of this foundation has been the award of grants-in-aid for programs of research in anthropology and related branches of science.

WOODLANDS IN SPRING—Cornell Rural School Leaflet, Vol. 47, No. 4—*New York State College of Agriculture,* 32 p., illus., paper, 10 cents. Presenting to children the changes that take place in the plants and animals of the woods in the springtime.

Science News Letter, August 7, 1954

ASTRONOMY

Spot Periodic Comet For Fourteenth Time

➤ PERIODIC COMET Faye has been spotted on its return to a visible part of the sky by Dr. George Van Biesbroeck of Yerkes Observatory, Williams Bay, Wis.

This is the 14th time it has been sighted since its discovery in 1843. Its magnitude is now 17, too faint to be seen except with a large telescope.

The comet will continue to brighten until March, 1955, when its magnitude will be 15. It has a period of seven years, and was found close to its predicted position, in the constellation of Aquarius, the water carrier, which can be seen low in the southwestern sky in the early evening.

Science News Letter, August 7, 1954

SURGERY

Bullet in Neck Starts Trouble 50 Years Later

➤ A MAN who carried a bullet from a .22-caliber rifle in his neck for 50 years before it gave any trouble has now had the bullet removed at the Mayo Clinic, Rochester, Minn.

He was accidentally shot at the age of 14. The bullet entered above his lip, below his left nostril, nicking his tongue and lodging in his neck. Actually it lodged in the first vertebra in his neck, right below the skull, as X-rays later showed.

He recovered from the accident without disability and was well for 50 years. Then one day while cranking a motor he felt something snap in the back of his neck. For the next month he had pain, tenderness and swelling in the back of his neck high on the right.

The bullet, it turned out, had caused osteomyelitis, or bone inflammation and infection, with abscesses that drained pus through a sinus. This sinus in the back of the neck presumably connected with the man's throat, because he reported tasting the medicine used to wash it out, and radioactive, opaque material run into the sinus from the neck opening could be seen, in X-ray pictures, in the soft tissues at the back of the throat.

After removal of the sinus and bullet fragments the man recovered. His case was reported by Dr. Collin S. MacCarty of the Mayo Clinic and Foundation and Maj. Robert A. Mendelsohn, Air Force medical officer assigned to the Mayo Foundation, in *Proceedings of the Staff Meetings of the Mayo Clinic* (June 30).

Science News Letter, August 7, 1954

PUBLIC HEALTH

Rest May Be Harmful

Doctor reports that hard work can be good for a person while rest can be damaging, affecting the circulation, muscles and kidneys adversely.

➤ WORK, EVEN hard work, is good for a person while rest may be damaging.

This idea, bound to be unpopular in some quarters, comes from Dr. W. Melville Arnott, professor of medicine in the University of Birmingham, England.

Work got its bad name, he states, because it includes, or has included in the past, an element of exploitation. Toiling for 70 or 80 hours a week in the "dark satanic mills" of the last century was harmful, he agrees.

However, he says, when a claim is made that to work for more than 40 hours per week in a modern factory or shop is unhealthy, no one is really expected to believe that it is the work itself that hurts.

"Such a claim," Dr. Arnott says, "is merely a move in the complex adjustment of remuneration, the setting of the dividing line between normal and overtime rates."

None of the known effects of work, he states, can harm healthy tissues. On the contrary, all the effects are good in the sense that they develop and extend the range of adaptation of physiological mechanisms.

Rest, on the other hand, can produce profound and damaging changes. Blood circulation, blood vessels and kidneys show these effects. Muscles lose their tone, ligaments stretch and joints get out of position from long rest in bed. Appetite fails and constipation is common, showing the effects of bed rest on the digestive system. Even the skin may show damage, with bed sores developing at pressure points.

Doctors are getting away from the idea that sick people must stay in bed except during the acute stage of the sickness, Dr. Arnott points out in *Lancet* (June 19).

However, Dr. Arnott still thinks rest is being overdone and says about work, "We should all agree that work, even hard work, which involves no avoidable hazard, does not interfere with sleep or nutrition, which is remunerated sufficiently to remove any sense of exploitation, and which allows of enough recreation to counteract tedium, is harmless.

"Indeed, it is beneficial."

Dr. Arnott's complete report on the abuse of rest and the good features of work was made to the Royal Society of Medicine in London.

Science News Letter, August 7, 1954

MEDICINE

Why People Smoke

➤ WHY PEOPLE smoke will be investigated under the research program being financed by the Tobacco Industry Research Committee, its scientific director, Dr. Clarence Cook Little, has announced.

The body chemistry, glandular and nervous systems of smokers, and the characteristics of smokers and non-smokers are the things Dr. Little sees coming under investigation to help answer the question as to why people smoke.

Probably the primary research that the tobacco industry will push will go into the physical and chemical composition of tobacco and accompanying products.

American Cancer Society and other cancer authorities, who believe cigarette smoking is a cause of lung cancer, have already suggested that something in the kind of tobacco now grown for cigarettes or in its treatment may be responsible. This was suggested during June when the cancer society's big report on smoking and lung cancer and other deaths was released (see SNL, July 3, p. 6), and again at the Sixth International Cancer Congress in Sao Paulo, Brazil.

Although scientists have already shown that cigarette smoke condensate will cause cancer when put on the skin of laboratory animals, the tobacco industry intends to sponsor more research along this general line.

"We want to learn what changes, if any, take place in the different animal and human tissues when subjected under varying conditions to tobacco derivatives, smoke itself, as well as other potential irritants, such as air pollutants," Dr. Little said.

Science News Letter, August 7, 1954

TECHNOLOGY

Special Equipment For Underwater Salvage

See Front Cover

➤ A NAVY diver uses a special underwater cutting torch to work his way through a ship resting at the ocean's bottom in the photograph shown on the cover of this week's SCIENCE NEWS LETTER.

From World War II to the present time, deep sea divers and underwater salvage personnel have recovered millions of dollars worth of valuable military equipment.

Science News Letter, August 7, 1954

• RADIO

Saturday, August 14, 1954, 3:15-3:30 p.m. EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Frank Fremont-Smith, medical director, Josiah Macy Jr. Foundation, will discuss "World Mental Health."

PLANT PATHOLOGY

Atomic Radiation Checks Fungus Disease of Plants

➤ RADIATION HAS successfully checked a fungus-caused plant disease in experiments that may uncover new peacetime uses for the atom.

Resistance to Fusarium wilt, a common plant disease in the New England area, has been increased 50% in plants exposed to small amounts of ionizing radiation.

In the future, it may be possible to irradiate whole farm crops to protect them against wilt diseases, for which no good controls are now known. Small plants could be treated simply and inexpensively.

The resistance has been produced without changing the plants genetically. Previous experiments had developed disease protection in plants only by development of mutations.

The experiments are being conducted by Dr. Paul Waggoner, plant pathologist at the Connecticut Agricultural Experiment Station, New Haven, under contract with the Atomic Energy Commission.

One of Dr. Waggoner's problems was that of controlling the disease without killing the plant. High dosages that gave plants almost complete immunity to disease also stunted plant growth seriously. Some radiation doses, instead of making the plants resistant, made them highly susceptible to diseases.

The best results were obtained by a low radiation dose, which had a negligible stunting effect, and by delaying the disease introduction several days.

Science News Letter, August 7, 1954

HEMATOLOGY

Can Get Rh Blood Tolerance From Mother

► A WOMAN with Rh negative blood whose mother had Rh positive blood is likely to develop some tolerance to Rh positive blood that helps when she meets it in her unborn child.

The help apparently is to the daughter but does not extend to the grandchild. That is, the mother's tolerance to Rh positive blood apparently does not prevent the serious blood-destroying condition that may develop in her child if the father is Rh positive.

Discovery of this actively acquired tolerance to Rh positive blood, made by Drs. Ray D. Owen, Harold R. Wood, Alvin G. Foord, Phillip Sturgeon and L. G. Baldwin of Pasadena and Los Angeles, is announced in the *Proceedings of the National Academy of Sciences* (June).

Rh negative women whose mothers are also Rh negative, however, are not as likely to show tolerance to Rh positive blood.

The differences in tolerance to Rh positive blood show in tests of the mother's blood but not when development of erythroblastosis, the condition in babies whose parents have opposite Rh types, is used as a sign of Rh tolerance.

The mechanism by which an Rh negative woman has acquired some Rh tolerance from her Rh positive mother is not known. It might be either through the Rh antigen itself or intact cells of the mother getting into the daughter's blood before birth.

The studies were made at the California Institute of Technology and Huntington Memorial Hospital, Pasadena, Calif., and Children's Hospital, Los Angeles.

Science News Letter, August 7, 1954

ORNITHOLOGY

NATURE RAMBLINGS

Swans

► ACCORDING TO ancient custom in England, the swan has the status of royal bird, and swan-keeping is a royal prerogative.

Under certain conditions, the Crown will grant the privilege of keeping swans, together with a "swan mark," a mark similar to a cattle brand which is cut into the bird's upper bill for identification.

The swans seen on the Thames bear the swan mark of the king and of two guilds, the Dyers Company and the Vintners' Company. Once a year, all Thames swans are collected in a ceremony known as "Swan-Upping," and the young cygnets are marked and their flight feathers are cut.

This royal bird, the mute swan, is a native of Europe and Asia. It was introduced into North America as a domesticated bird to adorn parks and estates in the European manner. In the course of time, individuals have escaped from domestication, and by now the mute swan has become established to some extent in the East, notably in the Hudson Valley.

Despite its name, the mute swan is capable of making sounds. It can sound a resounding trumpet call and when aroused, it hisses angrily.

The two native American swans are the trumpeter swan and the whistling swan. The trumpeter, largest of all swans, reaches a length of more than five feet, measured from bill to tail with the neck stretched straight as in flight. It is the most publicized of the swans in this country because of the heroic fight being made to save it from extinction.

Although trumpeters once existed in great numbers here, the steady development of the land has slowly driven it towards the vanishing point. Small numbers of wild trumpeters in Canada and a few hundred which seem to be thriving on government wildlife refuges in the West represent the last slim hope that this magnificent bird will survive.

For whatever consolation it may be if the trumpeter becomes extinct, its call has been recorded for posterity. In 1937 Dr. A. A. Allen capture two cygnets and then made a transcription of the ensuing rescue by the two parents, complete with cries of distress from the youngsters, the reassuring honks of the parents and then finally the swanly hubbub of happy reunion.

The whistling swan is about ten inches shorter than the trumpeter, and gets its name from the shrill sound, not really a whistle, uttered by the migrating flock. The whistler breeds in the far Arctic north.

This fact, plus its habit of extremely high flight and a strong innate wariness, seems to account for the whistlers' marked success in surviving on this continent which man has rendered so inhospitable for so many other creatures.

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Questions

ASTRONOMY—What is a fireball? p. 90.

□ □ □

MATHEMATICS—How is arithmetic now being taught by Columbia University experts? p. 86.

□ □ □

MEDICINE—Why is it difficult to diagnose polio accurately? p. 91.

□ □ □

METEOROLOGY—Why do cities have "heat islands"? p. 85.

□ □ □

PUBLIC HEALTH—Why should cooked food be kept cold, particularly in summer? p. 84. How can rest be harmful? p. 93.

□ □ □

VETERINARY MEDICINE—How can cattle grubs be destroyed? p. 87.

□ □ □

Photographs: Cover, U. S. Navy; pp. 83 and 90, Fremont Davis; p. 85, General Motors; p. 86, Columbia University; p. 87, Clifford E. Matteson; p. 95, Carnegie Institution of Washington; p. 96, Raytheon Manufacturing Company.

PSYCHOLOGY

Dim View of Old Age

► MEN AND women in their 20's and 30's take a dim view of old age.

Dr. Jacob Tuckman of Teachers College, Columbia University, New York, reported to the Third International Gerontological Congress in London that even "sophisticated, educated adults" stick to the notion that the later years are times of lessened happiness, lessened ambition and increased worries.

The sophisticated, educated adults of his report were students in a graduate course on the psychology of the adult. However, they evidently do not agree with the philosopher who, according to Robert Browning, said:

"Grow old along with me!
The best is yet to be,
The last of life, for which the first was made."

Dr. Tuckman and Prof. Irving Lorge of Teachers College asked the 71 men and 52 women in the psychology course to rank the age periods of the life span from most favorable to least favorable for "happiness," "freedom from worry" and "ambition."

The average age of the group was 32.

For happiness, early childhood, adolescence (13-19 years) and the 20's and 30's were rated most favorable. For freedom from worry, the students ranked early childhood as most favorable. For ambition, adolescence and the 20's and 30's were considered most favorable.

There was no significant difference between the sexes in ranking age periods for happiness, freedom from worry and ambition.

The negative judgments of old age by this group, Dr. Tuckman said, shows the need for spreading the idea that age, in and of itself, is not the thing that determines happiness, productivity and security.

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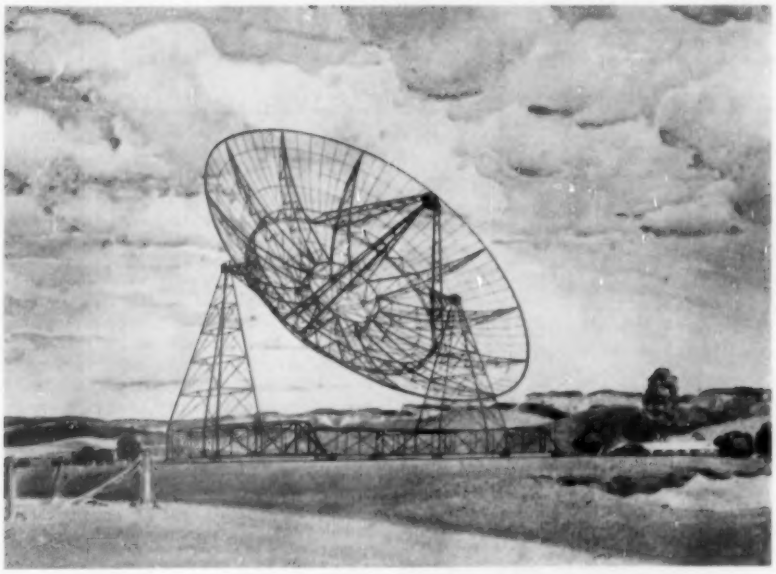

PROPOSED RADIO TELESCOPE—An artist's sketch of the giant radio "dish" planned to scan the heavens from Australia for cosmic noises constantly being received on earth from the heavens.

RADIO ASTRONOMY

Plan New Radio Telescope

Plans are announced for the erection in Australia of a giant radio telescope to explore, in the radio wave region, the stars visible from the Southern Hemisphere.

➤ INTERNATIONAL COOPERATION and the new science of radio astronomy are both seen aided by a $250,000 grant from the Carnegie Corporation of New York to build a giant radio telescope in Australia. The award, announced by Dr. Vannevar Bush, president of the Carnegie Institution of Washington and a trustee of the Carnegie Corporation, will be administered by the Commonwealth Scientific and Industrial Organization in Australia.

It will provide part of the costs of constructing a giant radio wave "dish," 250 feet in diameter and about 60 feet deep. The radio telescope will take about three years to build and to mount so that it can be tilted or rotated in any direction in order to aim it at a particular section of the sky.

The receiving antenna was designed by the Radiophysics Laboratory of Australia's CSIRO, Sydney, which is directed by Dr. E. G. Bowen, a British-born physicist of international reputation. His chief assistant is Dr. J. L. Pawsey.

Some of the most significant recent work in radio astronomy has been done by the Australian group, Dr. Bush stated when announcing the grant.

"Their achievements in this field stand as one of the most constructive and fruitful activities in science which has developed, to my knowledge, since World War II," Dr. Bush said.

The grant represents a wise investment in "international relations as well as in science," Dr. Bush pointed out. Radio astronomy research in Australia, he said, exhibits all the elements for a vigorous and imaginative program—outstanding leadership from Dr. Bowen, an enthusiastic group of experienced young investigators, and a clear indication that the new "dish" is an essential for the next big advances in the field.

Developments in radio astronomy date back to the early 30's when it was discovered that radio waves originating beyond our solar system can be detected on earth. As a result of intensive world-wide research, mostly since the war, such radio waves are now used to study a broad range of astronomical phenomena, including the sun, the moon, the Milky Way and remote galaxies in outer space.

With the proposed radio telescope, scientists can explore the heavens from the Southern Hemisphere, particularly the Magellanic Clouds, complementing radio wave observations at Manchester, England.

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GENERAL SCIENCE

Standards Bureau Moves Radio Branch to Colorado

➤ THE NATIONAL Bureau of Standards is moving its radio propagation division to Boulder, Colo., from Washington. The Rocky Mountains and wide, wind-swept plains offer better "laboratory" conditions.

About 217 acres of land were donated to the Bureau by Boulder citizens and civic groups. A new $4,000,000 building, which will house the radio laboratories, was completed in May. It was especially designed for research in radio wave propagation and radio standards.

Most of the scientists who will work in the transplanted Central Radio Propagation Laboratory already have moved, including Dr. Frederick W. Brown who heads the new facilities. The rest of the personnel will follow by early September.

The move was found necessary because radio research scientists needed a location near mountains, plains and the ocean. Several sites were considered, and the Boulder area, which offered plains and mountains, was chosen as a compromise. Climate and wind also played a role in the selection of the Colorado spot.

Washington will retain radio station WWV. To be administered from Boulder headquarters, the station broadcasts standard time and frequency signals to the East Coast and ships in the Atlantic Ocean. Its counterpart in Hawaii, station WWVH, blankets the Pacific and West Coast.

Some current radio research experiments will continue in Washington, as will the North Atlantic radio warning service and some classified research.

The Bureau already has a cryogenics laboratory, for experiments at temperatures near absolute zero, at Boulder.

Science News Letter, August 7, 1954

By mechanically rubbing a sample of *fabric* across a metal case containing a microphone, 20 popular fabrics were tested for "loudness"; crinoline was the noisest material tested and satin was the quietest.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 738. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

BIRD SOUNDBOOK captures the visual and audio beauty of 24 American songbirds with recordings and full-color photographs. The accompanying text describes the birds' habits and explains how wild birds can be photographed and their songs recorded. The soundbook is sold with either 33 1/3 or 45 rpm records.

Science News Letter, August 7, 1954

PACKLESS PUMP, hermetically sealed and completely sanitary, is designed for use in medical, food processing, chemical and oil industries. The pump works on a vibration principle, needs no lubrication and can be cleaned in a few minutes.

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SPRAY GUN, attached to a garden hose, mixes soap or detergent with water to supply a spray of rich suds for washing cars, window screens and storm sashes. The unit has a three-speed mixture control and can be used to apply soluble ferilizers, soil conditioners, weed killers and insecticides to lawn or garden.

Science News Letter, August 7, 1954

RADIO-DIRECTION FINDER receives AM broadcast, marine and beacon radio signals and determines the compass direction of the station to which the set is tuned. Equipped with a map and this portable radio, shown in the photograph, a man could locate his position any place on the globe if he could pick up two radio stations.

Science News Letter, August 7, 1954

GLITTER-GLOW kit provides glitter crystals and a phosphorescent-fluorescent paint that glows in the dark and gives startling effects under ultraviolet. Designed primarily for children's use, the glitter will be useful to Mom for decorating gifts.

Science News Letter, August 7, 1954

HAND TRUCK has a hydraulic lift, similar in purpose to those on factory fork-lift trucks. One man can handle 500-pound boxes. The lift operates like a manual auto jack, raising loads as high as three feet.

Science News Letter, August 7, 1954

ELECTRICAL REPAIR KIT includes everything needed for simple electrical work. A pliers-like tool cuts and strips wire, crimps solderless terminals and connectors, and shears bolts and screws. Splices, terminals, connectors and wire insulation are included in the kit.

Science News Letter, August 7, 1954

LINE SWIVEL has a unique ball bearing assembly that turns easily to allow spoon, plug, spinner or bait to rotate without twisting fishing lines and thereby causing the lines to stretch and weaken. The unit is kept in proper working position by free-moving eyes to which the line is attached.

Science News Letter, August 7, 1954

Do You Know?

The highest death rate from *drowning* is recorded among boys 15 to 19 years of age.

About 11% of the car owners in the U. S. have more than one *car*.

When a drinker enters the chronic phase of *alcoholism*, half the alcohol previously required may be sufficient to bring about a stuporous state.

In the few areas in the world where *cannibalism* is still practiced, natives believe that eating their dead is the most respectful way of disposing of the bodies.

The five educational *television* stations now on the air bring to their viewers a total of 25 courses, ranging in subjects from piano lessons to salesmanship.

Sweet clover is a quick growing legume valuable for soil improvement, for nutritious pasturage and as a honey plant for bees.

The chief danger from plutonium is that, like radium, its *radiation* destroys the blood-making organisms of the body if it enters in appreciable amounts.

Airplanes traveling from an area infested with *Japanese beetles* to a non-fested part of the United States are required by the U. S. Department of Agriculture to be treated for hitchhiking beetles.